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THE
MADRAS FAMINE.

WITH APPENDIX

CONTAINING

A LETTER from MISS FLORENCE NIGHTINGALE,
AND OTHER PAPERS.

BY

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THE INDIAN FAMINE.

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We have had, in the past Session, four discussions on the subject of India. In all which, of course, the most terrible visitation that has occurred in our time, the present Famine, has been the most prominent point, but in all, the word *Water* has, I believe, been never once mentioned. Most assuredly, then, our first enquiry is, what can be the reason of this omission? There must be some most tremendous pressure that could force the Officials carefully to avoid any allusion to the one thing upon which all depends in the matter. The slightest hint of the subject of *Water* might have led to the dangerous question, what becomes of all the *Water*? This would be treading upon most dangerous ground. It might even lead to a demand for information upon the whole question of *Water* for production and *Water* for transit. The moment the question is started we come upon the fact that one single river in the peninsula pours into the sea in a single day, 5,000 millions of cubic yards of *Water*, enough to produce rice for two millions of people for a year. There was certainly *Water* enough flowing into the sea last year to provide food for the whole population ten times over, and it would supply *Water* for all the Navigation Canals that could be cut throughout India. There is therefore no want of *Water*. The only remaining question then is, What would it cost to distribute the *Water* over the Land and along the Navigation Canals? The answer to this is that all the great Irrigation works already executed by our Government, Irrigating about six millions of acres, or rather

capable of Irrigating that quantity, for they are not all in operation, have cost about £2 an acre on an average, and the value of an average acre in increase of produce is about £3, and that cost includes Navigation. There remains, therefore, no question about expense. The cost of Irrigation and Navigation bears no proportion to the value of produce and carriage. There is certainly, in one single case, a remaining question, viz :—in that of Orissa, which is, Will the people use the Water ? The first answer to this is, that this is a single exception. The second is another question, what must the management be, where the people can't be persuaded to buy Water at $2\frac{1}{2}$ -ru. an acre, that is worth, even in ordinary seasons, £1 10s. an acre ? The fact is that it is nothing in the world but unaccountable mismanagement that prevents the water being used. There was one other case of this, but the Famine has swept away all obstacles there, and now the Water is in high demand, and no wonder, when they are actually selling the produce for 140-ru. an acre, where the water-rate is 6-ru. an acre, so that in a Famine year one crop will pay 24 years' water-rate. Thus it does not take five minutes' investigation to prove, indisputably, that the sole cause of the Famine is the refusal to execute the Works that will give us the use of the Water that is at our disposal. This matter has been pressed upon the Authorities in every possible way for forty years. It must be acknowledged that something has been done in this way of late years, and happily quite enough to prove every thing that we require to know in order to enable us to come to a sound conclusion as to whether we should proceed boldly with the undertaking. There are now twelve vast Works, each capable of Irrigating from half a million acres to two millions, either in actual operation or far advanced. But these Works are all in detached patches as they were pressed upon the Government by subordinate Officers, without any general plan. When Railways were undertaken, a complete project for all India was sketched out by the supreme Authorities and not isolated patches. But no arguments were sufficient to persuade the Authorities to set about this great work of rescuing

India from Famines, so that now we have before our eyes the sad and most humiliating scene of magnificent Works that have cost poor India 160 millions, which are so utterly worthless in the respect of the first want of India, that millions are dying by the side of them. Could there be a more grievous proof of our strange want of wisdom in our management of the Country of which God has been pleased to make us the Guardians? Had one quarter of this money been spent on the Works that were the first required for India's peculiar needs, not only would there be entire security of food for the people themselves, but India would at this moment have been feeding England, for it is nothing but the want of cheap carriage from the great Wheat districts of India that prevents 20 millions worth of our own staple food coming from that Dependency. We cannot therefore, be surprised that the word *Water* has been so carefully left out of the Indian discussions on the Famine, in the House of Commons and at Cooper's Hill. If it is said, But our present question is what must be done to save the people's lives now, I answer, We are spending Millions! How are we to spend them? We are employing a Million of people! How should we employ them? If in consideration of this question we are to exclude the word *Water*, if this is a *sine qua non* in the matter, we must lose all the money and leave the Country in the same state of exposure to the horrors of another Famine. The main point of all is this, that we have the most indisputable proof that the Country must not leave the Famine in the hands of the India Office. Nothing can be more certain than that a real and independent discussion is absolutely required. In the case of the Inflexible and the Navy this has been seen and acknowledged, and a Commission, independent of the Officials and free from the bias that their peculiar position brings them under as essential to the effectual investigation of the subject, has been granted, and the case of the Indian Famine is exactly the same. The India Office are so committed against Irrigation and cheap transit that it is perfectly hopeless to attempt a solution of the question by leaving the matter in

their hands. The very first thing, therefore, to be done is to obtain such a Committee as has been acceded by the Government in the case of the Navy. When the Country is called upon to contribute funds from private sources, what can be more legitimate than that they should have a voice in the application of it, and that it should not be left still in the hands of those who, whatever other things are questionable, have certainly failed to preserve India from all the horrors of Famine. This surely is certain; should not somebody else be called in to carry out an investigation as to the cause of this failure? Can it be supposed for a moment that those who have thus failed will be free to bring into clear light their own failure. Its quite impossible but that they will be under a most powerful bias to say nothing that shall incriminate themselves, and we must confidently expect that if we leave the matter still to them, the word *Water*, upon which all hangs, will still be excluded. Surely the question is not one to be trifled with, while the lives of many Millions are at stake, not only in the present Famine but in all future ones. Under these circumstances can there be a more reasonable demand than that a Famine Commission, composed of well known names, in whom the Public have confidence, should be the very first step in the movement that is now making to relieve this vast population under the most awful calamity that could befall them?

Before proceeding to consider what are the particular measures that it may appear in our present knowledge of the case advisable to adopt, let us consider the essential points which have been so earnestly concealed in all that has been said officially of late. For instance only think of there being at this moment 4 districts in the midst of the famine that are not only, not themselves unprovided with food, but are selling a full crop at famine prices, and are saving the lives of multitudes around them. What are we to think of this tremendous fact being never alluded to in these speeches. One of these districts is certainly partaking in the famine, but not the part of it which has Irrigation works. Is the subject dealt with truly and honestly if

these things are concealed? Again in the Nelloor, Kistnah, and Godavery districts, the produce is not only exported, but it is exported for some distance by the Canals in any quantities at a nominal cost. Just so far as these Canals extend there is no question at all about *Carriage*. There is not the slightest difficulty in sending *any quantity*, and the cost is nothing. If they extended through India there would not be the smallest question about *Carriage*. Have these things no bearing upon the Famine? In these 4 districts, 2 Million Acres are Irrigated, producing 1,200,000 tons of food, sufficient to feed 5 Millions of people for a year. What would be the state of things if the whole of this food were wanting? The concealment of these facts totally falsifies the whole case. In Kurnool alone under the Madras Companies Works 84 Million lbs. of Food were produced last year, with fodder to preserve the lives of all the cattle, while all the surrounding Country is absolutely desert, Tens of Thousands of people and all the cattle dying. Are these things nothing? This tract is in the very centre of the worst part of the famishing districts. The sole cause of this garden in the midst of the desert is that it has been Irrigated; nothing else, and through it runs one Main Line of Canal, 190 Miles long, capable of being traversed by boats of 250 tons. Now nothing can be more certain than that if the suffering districts had been treated in the same way there would have been no Famine, no want of Grain and no question about *Carriage*. Had this very money which is now being spent in a vain attempt to save the lives of the people, been spent on such works, this whole tract would have been revelling in abundance. And so with Transit, if these Canals had been continued throughout India, all India could have been laid under contribution if needed to supply additional food. All these things have been pressed upon the Authorities times without number in every possible way, but all in vain, and now the only alternative is to conceal them from the public. In the Godavery district there are some 700,000 Acres under Irrigation, producing, at present prices, grain worth 4

Millions sterling, this in the very district in which there was a terrible Famine 40 years ago, and which was in such a terrible state some years afterwards, that a special Commissioner had to be sent to investigate the case. These are some of the facts that would come before a special Commission on the Famine, but not a word of which will come before the public, if the matter is left to the India Office. Are these things not sufficient to show that the case is one most urgently demanding special treatment and real investigation? Though I am in a minority in this matter, the following extracts will show that I no longer stand quite alone. In the India Office itself, where it is, that the word *Water* is a proscribed word, I find three persons who dare openly to support this side of the question. Gen. Strachey, one of the first men in the Engineer department, who has been many years employed in connection with Public Works and now a Member of the India Council, said at the Royal Institution, on the 18th of May "We must be content to pass through a condition of "periodical suffering of an acute kind, during which ways of "escape from these evils will be gradually perfected. These "ways are indeed already sufficiently evident, and so far as "they have been applied, have been found to be thoroughly "efficacious. They are the provision of artificial Irrigation "and improved transport." And he "has passed a considerable "portion of his life in seeking for the means of extending those "essential material allies in the battle of Indian life." My next India Office witness is the present head of the Irrigation Department, Mr. Thornton, who lately read a Paper at the Society of Arts, in which he gives in figures from the Official Records, the Returns from *all* the new Government Works of Irrigation, the lowest being five per cent. and the highest forty. He states that this result was arrived at with the assistance of the Head of the Railway Department, Mr. Danvers, the man whose bias, if he had any, would necessarily be against the Navigation Works. He adds; "Even to myself these are "unexpected favourable results, and they will probably take

“ other people by surprise, but they will, I hope, be allowed to
 “ have been honestly arrived at. Wherever, in India, agriculture
 “ is entirely dependent on the sky for its supply of Water, any
 “ very sensible failure of the periodical rain is inevitably
 “ followed by a corresponding failure of the crops, and the
 “ Government, besides having to make large remissions of Land
 “ Revenue, has to incur a large and often immense expenditure
 “ in order to prevent the defaulting Cultivators from dying of
 “ starvation. In such cases, if Irrigation has been provided,
 “ the value of such Works becomes strikingly evident. The
 “ enormous outlay of the Famine of 1874 would have been more
 “ enormous still, but for the Sone Canal which, even then in its
 “ imperfect condition, and when the entire expenditure on it had
 “ not exceeded £800,000, enabled luxuriant harvests, valued at
 “ £500,000, to come to maturity over 159,000 acres where
 “ otherwise every green leaf must have been parched into
 “ powder,” and so on. “ If the indirect savings in this way are
 “ added to the direct annual earnings, the result would be a
 “ total that would convince the most sceptical, that, regarded as
 “ a whole, the investment of the Indian Government in Irriga-
 “ tion Works, has hitherto been the reverse of unprofitable.”
 He adds many things to the same purport. Our next India
 Office testimony is Mr. Cassells, also a Member of the Council,
 who was in the chair on the same occasion, and who said ; “ He
 “ had never seen the facts and figures more clearly brought
 “ forward on this important subject. He felt very proud to
 “ think that he had insisted upon this subject being brought
 “ forward, and had asked Mr. Thornton to take it in hand. As
 “ a Merchant long acquainted with trade, he concurred in the
 “ fullest manner with what Sir Arthur Cotton had said as to the
 “ necessity of providing cheap transit if you wished make a
 “ Country prosperous ; in fact it was the foundation of all good
 “ trade and of National wealth. He begged to assure him,
 “ however, that there were those upon the India Committee who
 “ never lost an opportunity of insisting upon that policy. And

“ he only wished that he were a few years younger, that he
 “ might live to see things done in India which he felt sure would
 “ be done in the next generation. There was water enough in
 “ the Country if it were utilized, and he hoped, even yet, to live
 “ to see many excellent admirable Works of Irrigation carried
 “ out.” These are pretty strong testimonies to come from the
 India Office itself, and it is certainly impossible to get over them.

Let us hear another witness, unconnected with the India Office ; Mr. Monier Williams, in a letter to the Times, says “ All
 “ the Belts of Land reached by the grand system of Irrigation,
 “ which stretches between the Godavery, Kistnah and Cauvery
 “ Rivers—fertilizing the soil wherever it reaches, and forcing even
 “ haters of the English Rule to acknowledge that no other Raj
 “ ever conferred on India such benefits—present a marvellous
 “ contrast to the immense tracts of arid waste which meet the eye
 “ of the traveller as he journeys by the great India Peninsula,
 “ Madras, and S. India Railways.”

Now let us hear what the Chairman of the Madras Irrigation Company says ; in writing to the Times about the Navigation of their Canal, he says, “ You make the very pertinent enquiry, how
 “ is it that the Madras Company have not utilized their Canal
 “ for purposes of Transport? You suggest indeed that it should
 “ be the subject of official enquiry, as it is of such paramount
 “ importance in the interest of the people now destitute and
 “ starving. I wish with all my heart that this enquiry were
 “ instituted, for though it would bring no new facts to light
 “ which are not well known to the Authorities both here, and in
 “ India, it would bring those facts home to the public mind of this
 “ country, with a force and weight which would lead to a prompt
 “ and effectual remedy.” He goes on to say “ however valuable
 “ Railways may be, they cannot claim precedence of works
 “ which produce, as well as convey food, and having lived in the
 “ Madras Presidency 24 years, and having witnessed the effects
 “ of a Famine, I know the only remedy for such heart-rending
 “ and disastrous visitations is works of Irrigation.” He then

“ quotes from the reports on the works and adds, “ in these
 “ remarks he is speaking of the results of an Irrigation of about
 “ 90,000 Acres, whereas the Canal is capable of Irrigating more
 “ than four times as much. Here there are works capable of
 “ feeding 4,000,000, of people for two months or nearly 700,000
 “ for a year, and of saving the Government an outlay of £2,000,000.
 “ The calamity now desolating the Madras Presidency will not be
 “ without its lesson if it only impresses upon our rulers the true
 “ value of these works, and that the prime want of India is
 “ Irrigation and *cheap* transit.”

With respect to the latter point, viz. cheap transit, I may state that so impressed was Lord Mayo with the necessity of this, that he had actually begun a Canal by the side of the Railway from Calcutta to the Coal fields, and that in stopping it he said in a letter to the Government of Bengal ; “ should the discovery of coal at Midnapoor result in a coal
 “ field equal to Raneegunge, *one of the principal objects in*
 “ *the formation of the Damooda Canal* would no longer exist,
 “ because the coal would be carried by the Midnapoor canal to
 “ Calcutta.” What could be a more complete acknowledgment of the truth of these views than this. If after spending £25,000 a mile upon a double Railway, a Canal was absolutely necessary by its side to carry coal, (and by consequence almost all other goods, for they stand upon the same ground precisely,) it is proved that the Railways have failed to give cheap transit to the country. Further this is what a Railway Engineer says on this subject ; Mr. Leslie, who constructed the extension of the Eastern Bengal Railway, as soon as he had finished it, wrote a letter to the Calcutta merchants on the construction of a Canal by the side of it, in which he says, “ with respect to revenue, when a Canal of
 “ sufficient capacity is once available, there can be no doubt that
 “ it would command the *entire goods traffic* provided the tolls are
 “ not too high. The present *Eastern* traffic is 1,900,000 Tons
 “ per annum, and it is rapidly increasing ; a toll of 1½-ru. a ton
 “ on this traffic alone would yield a return of £237,000, sufficient

“ to pay 11 per cent. net on a capital of £2,000,000. Assuming
 “ the actual cost of traffic to be one shilling a ton, the total cost
 “ of goods would be 3s. 6d. a ton, at which rate there would
 “ be a saving of £837,000 on the Eastern traffic alone as
 “ compared with the present cost of traffic by Rail, Boat and
 “ Steamer. This sum is equal to a tax of 8 or 10 per cent. on
 “ the produce of the Eastern District, caused by *want of adequate*
 “ *means of cheap transit* ; and, to relieve its Eastern Provinces of
 “ such a tax, the Government cannot in justice refuse to grant a
 “ concession to a Company for providing a Canal from Goalundo
 “ (the confluence of the Ganges and Burhampoota,) to Calcutta.”

Now what stronger testimony could we possibly have to the absolute necessity of Water Carriage than these two, of a Governor General, who was completely committed to Railways, and the Chief Engineer, who had just constructed a Railway on that very line. Think of Calcutta paying a tax of a million a year in the shape of cost of carriage, while a Canal on that line would pay 11 per cent. net on the present traffic. And this on a single line of only 130 miles, and if it is now essential that Canals should be cut by the side of Railways that have cost more than £20,000 a mile, how much more is it advisable that on new lines, Water transit should be preferred to land carriage, and that the multitudes now fed by the Government should be employed in that way that must be at last adopted. I am happy to state that the Madras Government are now cutting three portions of Canal, one through Madras itself, one to connect that city with the Navigation works of the Kistnah and Godavery, and one in the Interior. But I must add two or three extracts from the reports of the Madras Company. Thus ; “ the sight of
 “ the Country under the Canal is truly refreshing. In one village
 “ I rode through tall Cholum fields for a mile or two. There,
 “ more than 300 Acres were saved from utter drought, and about
 “ 300 Acres were just ripening. It is very sad to compare this
 “ with the rest of the district where utter failure has occurred.”
 “ Again ; “ as far as I have seen, the appearance of the fields is

“ very assuring and abundance of Cholum straw will be obtained.
 “ As the inevitable loss of the cattle from want of grass or straw
 “ is the worst feature of the Famine, that which we save below
 “ the Canal will be a very great boon to the country. It is
 “ probable that the ryots under the Canal will save most of their
 “ cattle, and thus be able to resume work on the first appearance
 “ of rain ; elsewhere in the district it is probable that much land
 “ will lie idle, as nearly all the cattle will be dead.” Again ;
 “ there is little doubt that the Canal water affects the health of
 “ the people considerably. When procurable, Canal water is
 “ always preferred to well water ; some villagers are in the habit
 “ of going two miles for it. While in camp I was unable to find
 “ a well in any village containing water fit to drink. In
 “ Canagoodoor, though greatly in want of a drink, I was
 “ compelled to abstain from drinking the water from three wells as
 “ the taste of each was filthy.” Think of all this in the midst of an
 utter desert, solely from the Irrigation works, and not a word
 about it in any one of the speeches on the Famine ! How can
 we possibly mistake in concluding that there is something wrong,
 where such a monstrous absurdity is met with as this ? What
 can it mean that in these so called discussions, the one vital
 point of the whole matter is omitted ? I must insist upon this
 because it is really the essential point. Here is positive proof of
 an intense anxiety to lead the public away from the one clue to
 the solution of the question. Only omit the word *Water*, and the
 whole subject is entirely falsified. Only omit the fact that in the
 midst of this desert there are several districts in the very highest
 state of prosperity, revelling in abundance of food, and in wealth,
 by far the most prosperous districts in all India, paying
 enormous revenue, £600,000 a year each, three times what the
 other districts throughout India are paying, only omit these
 things and the public are completely deceived. And this is the
 real state of the case. One terrible feature of the time is that
 the leading journals are in the conspiracy. I have sent letters
 containing these facts to the Times, The Daily News, The

Saturday Review, The Daily Telegraph, to try and bring them before the public with reference to this terrible calamity, and all these papers have refused to insert them. I am glad to be able to say however that this is not universally the case, but that there are two that redeem the whole press from this reproach. These are the "Illustrated News," which has inserted a most noble letter worthy of the noble writer, Miss Nightingale, and the other is the "Iron Exchange," which has admitted letters from myself. I suppose nothing short of the force of this hurricane of calamity would have overcome and swept away the Miasmata that have settled down upon England in respect to her management of our grand ward. Here we have side by side districts in the last stage of suffering and misery, with magnificent railways, executed at a cost that has loaded the country with a perfectly hopeless debt, now amounting to upwards of 60 Millions, which is the actual balance against the railways at this moment, the districts which are now in this terrible state having each had about $1\frac{1}{2}$ millions spent upon them, (including the accumulation of interest,) and on the other hand, districts far above all the other districts of India in prosperity, and revenue, on which only from four to £700,000 have been spent on works suited to the wants and capacities of the Country, and the sole effort of the Officials, supported by the press, is to keep out of sight the results which are staring us in the face. The three districts of Tanjore, Godavery and Kistnah, which before the Irrigation Works, paid, with terrible difficulty, One Million £ a year, are now paying nearly Two Millions, the effect of less than a million and a half expended, and this with far greater ease than they paid the half before. If the other districts were treated on the same principles even to a very moderate extent, India would all be in the highest state of prosperity both in respect of the condition of the people, and in that of finance. The vile opium trade and the cruel salt tax might both be given up, and the whole finance settled on a thoroughly healthy foundation. The actual gain to the Treasury from these two shameful items, the utter disgrace of our rule,

certainly do not amount to more than ten millions, and this sum distributed over the 160 districts of India, would be only £60,000 each, while the increase in the revenue of the three above districts is about £300,000 each, so that if all the districts had been only improved to the extent of one-fifth of what has been accomplished in the three, we should be able to earn honestly, and with immeasurable benefit to the people, what we now make by so grievously oppressing our own people, and laying such an inconceivable curse upon a friendly nation, and who can estimate the weight of that guilt that is hanging over our head through this greivous reproach to our nation and Christianity? How easily God can take from us this illgotten gain by these Famines or by another war with China. Which would be most safe, most honourable, most satisfactory on every ground of these two modes of managing our finances? But when I speak of increasing the revenue of the 160 districts of India by these means that have been used in the three, as if they were each simply isolated districts, I leave out of sight the main point, viz. that all India would be knit together by a network of Internal Communications, that would not only place at the disposal of every other tract that which each supplied, but would enable India also to send her productions to the ends of the earth, for nothing hinders this at present but the cost of Land Carriage. Only unite the Ravee, the Sirhind, the Ganges, the Lower Ganges, the Sone, the Orissa, the Godavery, the Kistnah, the Toombudra, and other Canals together, and supplement them with those that are necessary to complete the network of cheap carriage throughout India; and the increase of wealth that would accrue, is far beyond all estimate. We cannot be mistaken about this, when we have the one item of a wheat supply for England depending upon this question of relieving it from the cost of internal carriage. Between the price in the N.W. 2s. 6d., and that in England averaging 6s. 6d., nothing stands in the way of the transfer of our main wheat supply from America to India but the £2 a ton inland carriage. And so with all sorts of things. The whole subject of transit is

so strangely misunderstood generally, that I must add a few words about it. What is the reason of the present state of things as respects the supply of the suffering tracts? Why is food at its normal cost over the greater part of India, while it is at three or four times that price in Madras? The sole reason is the want of cheap carriage. There is no approach to an equalization of the price of food. It could be conveyed 2000 miles by water for 5-ru. a ton, which is only one-twentieth of a penny a pound, quite a nominal difference, so that nothing is wanted to place every distressed district as it were along side of a prosperous one, in respect of supply, but a complete system of Steamboat Canals, which could be constructed throughout India without any difficulty. And 7000 miles of them instead of costing 160 millions as the Railways have done, would not cost above 20 or 25 millions, and there would be no accumulation of interest as in the case of the Railways. Nay, as Mr. Leslie has shown, the single Canal of 130 miles from Calcutta to Goalundo, would save the provinces there a million a year, the interest of 24 millions, the whole capital required for the 7000 miles.

It will help to explain this strange state of things about the water, if I mention one or two things respecting my communications with the India Office which have been going on so many years on this subject. I have endeavoured by letter or personal interviews with most of the Viceroy's and heads of the India Office, to get this matter fairly investigated, but have always failed. As a specimen of what has taken place, I may mention that when the Duke of Argyle was at the head of the Department, at my request, I was honoured with an interview with His Grace, in which I must say he gave me a most patient hearing, and went most intelligently into the question, and assured me that if I would put the points on paper, he would promise me that my paper should be fairly answered. Some months after, hearing that the answer was in the hands of official men in India, I wrote to His Grace begging that a copy might be placed in my hands. His Grace was good enough to do this, and I then answered the

paper, which was by Col. Chesney, paragraph by paragraph, and concluded by respectfully, but most earnestly protesting against the matter being left there; that as it was most certainly a case of life or death to India, (as it is assuredly at this moment,) they would come to a formal decision on the subject, and decide between Col. Chesney and myself. We were diametrically at issue; it was a vital question to India, and in justice to our great dependency, it could not possibly be right to leave the question unsettled. I begged them to appoint a real Committee, fairly and honestly selected, consisting of men who would represent both or rather all sides, so that all concerned in India might be put in possession of the different points of the question. No answer was conceded to this letter, and this vital question has been left to drift into the present awful state of things, and the only certainty in the whole matter now is that millions will perish. Wherever Water is led over the land, there is life, abundance, prosperity, contentment with our rule, ample revenue; wherever the country has been left in its natural state there is want of revenue, heavy expenditure, disgrace to our rule, poverty, misery, and death. If it is still said what are you to do if the people will not take the water; I ask, is an exception to command our proceedings? And further, if we are such clumsy administrators, that we can't get over so absurd a difficulty, why should we be as obstinate and stupid as the poor ignorant ryots of that one tract? Why don't we rather give them the water for nothing, than allow it to run still to waste? Even then we should receive large returns, for we cannot enrich the people without enriching the Treasury. But recurring to the India Office, I have received so many applications from many parts of the world asking for information on the subject of the India Irrigation Works, (for the fame of them has so extended now that they are looked to from all quarters for instruction,) that I wrote to the office begging that they would prepare a Blue Book, if not for our own use, for the information of others, but the answer was a refusal to give any information for publication. Inquiry has been made from California, the Cape, Australia,

Mauritius, France, &c., for the value of water is now at last beginning to be in some measure understood in many parts of the world. There is indeed some notice of Irrigation in the general Blue Book of the India Office, but only in a cursory way, and while some of the results in the least successful works are given, the magnificent results in Madras are carefully omitted. Nobody could suppose that there were works of Irrigation, not only returning 50 per cent. to the Treasury, but one or two hundred per cent. to the country. What is said therefore in that book, is only just sufficient to convey a false impression of the case. I cannot but hope that one of the results of this great calamity will be to cause a real and thorough examination of this, the fundamental point in our administration of India, and which most certainly is the sole foundation, on which we can possibly base a successful administration of that part of the British Empire, which contains six-sevenths of our population. I must not go into farther details here. I have surely said enough to satisfy the country on these points, viz :—

First. That an independent Commission should be appointed, composed of such men as will satisfy the Public that there will be a real, not a sham, investigation of the question of Public Works in India with reference to their bearing upon the Famines, the health, the finances, the opium and salt taxes and the general well being of India.

Second. That there should be formed a permanent Committee of the most complete kind to manage the Finances of that Department, keeping them quite distinct from the general Finances, so that we may see clearly the actual results, not only upon the Treasury, but also upon the Country generally. If such a Committee were appointed, who were free from all other duties, so that they could give undivided attention to that particular work, and have before them all the different kinds of Works, so that they could compare the results of each, there would be some possibility of a fair examination of the subject, and not as now, the most desperate efforts to bolster up a false

system rather than confess that they had made a mistake, which men are in danger of doing when they are committed to one particular line.

Third. That we have abundant proof now before us, in spite of the clumsy way in which these matters have hitherto been conducted, that India offers an unbounded field for the capital, energy, and philanthropy of England in the way of material improvement. Taking only Mr. Thornton's figures, and I am sure that they err on the side of under-estimating, we are receiving direct into the Treasury about double the present interest of money for what has been done while serving our apprenticeship, and now we shall start with the advantages of the experience of all our mistakes and discoveries, and a most complete knowledge of the Country, the People, &c. John Bunyan says most wisely, Captain Experience was a man very successful in his undertakings. There can be no comparison between the probable results of Works now undertaken with this immense advantage and those carried on without it. There is not the slightest necessity for our investing our capital on American or Spanish or Turkish Works of War or Peace; there is the safest possible field for Investment in our own Empire, not to speak of the absolute necessity for it, if it were only to preserve the lives of our People. Think for instance of a single line of communication of 130 miles, on the carriage on which there is, at this present moment, an expenditure of at least a Million and a quarter per annum, of which upwards of a Million could be saved by an effective work of transit. Perhaps hardly anything could give a more striking proof of the unaccountable mismanagement of these things in times past than that this loss of a Million sterling a year should have been going on under the very eyes of the Viceroy, the Governor of Bengal, and the whole Commercial Community of Calcutta, while the Government were spending £6,000 a mile upon Railways in Nagpore, on which the traffic is so insignificant that they are shut up a great part of the year because there is literally nothing to

carry. If this alone is not sufficient to convince anybody that the matter requires looking into, what could? I must again notice that this line for a Canal is brought forward, not by a hydraulic engineer, but by a professional railway man, who had just completed a railway on that very line.

Surely I am most amply justified by what I have brought forward, in appealing to the public to employ their holidays in searching out a solution to this question. How could I submit a more weighty one so far as material things can possibly go.

I add some papers in the appendix to this, especially the able letter of Miss Nightingale, than which nothing more to the purpose could be written. I may mention that the question of Water in India has been forced on her attention, in consequence of so many Indian sanitary questions being submitted to her, in considering which, she could not but encounter the subject of Water at every step. For whether the people were living in a sea of mud in the Monsoon, and drinking putrid or mineralized water in the dry season, if they can get any at all; whether they were in ordinary times dying of trifling fevers for want of stamina from habitual underfeeding; whether they were liable to die by millions in a famine, &c., "all depended upon the one thing," *Water*. When we began the works in Godavery, the first difficulty that met us was to supply the workmen with water to drink. Now in that very tract there is a stream of fresh river water flowing all the year round, through every village. There is no longer any question there about food to eat, water to drink or wash, provinder for their cattle, building materials, or other things brought to their doors by the Canals at a nominal price for carriage, or any thing else requisite to their material well being, and Miss Nightingale is set free so far as that district is concerned to turn her attention to other tracts, and to discover ways by which the population may be kept in life and health, without the regulation of the water, a problem which will try even her amazing powers to the utmost.

I cannot but append here extracts from reports just received

from the Madras Irrigation Companies Works, to show what ought to have been going on in every part of the famishing country.

June last. "It was laughable to visit the large and now "*opulent* Villages under the Canal in order to learn whether they wanted any more Water. Pointing to the wretched dribblets sent down the Channels to open them, they could not find words to express their disgust. See: is this enough for one single field? and so forth. So very different from this time last year. In all cases they promised with every possible insistence, that if more were given they would waste none, and that if Water were given at Night they would turn out and utilize it. The Canal will at last be fairly tested. If all go well there will be six feet in it during the next full moon, seven during that in August, and eight in September. In that state it is to be hoped, the October Monsoon will fall into it."

And again under date July 17th. "All the attention of the Staff during this month will be occupied in distributing the large body of Water now coming down the Canal. Just now every sluice is Irrigating day and night in the fourth and fifth sections; but Mr. Dumphy shows symptoms of being overdone near Caddapah" (the extreme end of the Canal, 190 miles from the Head) "and I am rapidly trebling the quantity of Water taken up at Jootoor by the seventh section in order to relieve him. Hitherto I have not heard of a single drop being wasted into the Pennair. The Weather at Kurnool up to the latest date is drier than ever, and here the new moon has passed without any signs of Rain."

Who can bear to hear these things and think that this, instead of being confined to a Tract 190 miles in length, ought to have been the case throughout the Peninsula, over the whole Country occupied by thirty millions of People; think of the poverty, misery and death spread over this vast region, when there might have been everywhere the same plenty, *opulence* and

life that is here recorded. One would suppose that even the India Office itself might be moved, and astonished at its unaccountable hatred of Water.

NOTE.—I would beg to offer for the consideration of the country, now that they are called upon to take a part in the affairs of India, that they should appoint independent Commissioners to go out and report to them both, the state of things in the Irrigated and Unirrigated Tracts, and how their money is disposed of. Such an independent enquiry is now essential.

It should consist of one person intimately acquainted with Irrigation and its affects, and one or two more, unindianized men, who would see every thing with fresh eyes.

APPENDIX A.

PROGRESS OF IRRIGATED DISTRICTS.

G O D A V E R Y.

Before the Works.

Average Revenue.

£

1836 to '46.....220,000

After the Works were begun in 1846,

	Revenue.	<i>Increase per annum.</i>
1836 to '51.....	£238,000.....	18,000
'52 ... '56.....	250,000.....	30,000
'57 ... '61.....	317,000.....	97,000
'62 ... '66.....	432,000.....	212,000
'67 ... '71.....	476,000.....	256,000
'71 ... '75.....	558,000.....	338,000

2271

Average Revenue per Annum..... 378,000.....158,000

Former Revenue 220,000

Average Increase 158,000

Years since the Works..... 30

Total in 30 Years 4,740,000

Add for '76 350,000

Total Increase in 31 Years 5,090,000

Thus this one district has increased in Revenue by 150 per cent, £340,000 a year, at which rate if the 160 districts of India had increased, there would have been an addition of 54 millions a year.

The Exports have increased from an average of £60,000 to £800,000; and the Imports from £23,000 to £180,000.

	Exports. £	Imports. £
1836 to '45.....	57,000.....	23,000
'46 ... '49.....	114,000 .	44,000
'50 ... '53.....	154,000.....	30,000
'54 ... '57.....	205,000.....	51,000
'58 ... '60.....	408,000.....	64,000
'60 ... '65		
'66 ... '69.....	704,000.....	157,000
'70	896,000.....	207,000
'71		
'72		
'73	672,000.....	162,000

I have not the returns complete to the present time.

The Traffic on the Main Line of Canal is about 200,000 tons.

KISTNAH DISTRICT.

	£
Revenue '46	220,000
Do. '74	550,000
	<u>330,000</u>

Increase 150 per cent.

TANJORE DISTRICT.

	£
Revenue in 1830 when the new works were begun	420,000
Do. in 1874	745,000

Increase.....325,000 or 80 per cent.

Thus these three districts are now yielding £1,850,000 in Revenue, or £600,000 each, while the average of all India is only about £250,000.

The total expenditure on Irrigation in these three Districts is under $1\frac{1}{2}$ millions, while the increase in Revenue is one million a year, and the total additional sums paid into the Treasury is about 15 millions, by $\frac{1}{50}$ part of the districts of India.

APPENDIX B.

To the Editor of the Illustrated News, June 29th.

Sir. You were good enough to admit a letter from me once on that subject of vital importance—I should say mortal—in India, Irrigation and Water Carriage. The frightful Famine in Madras recalls us all to it. When the Government are obliged to feed one Million and a half of our fellow subjects—when these have been perishing in spite of us, at the rate of 930 per thousand in the Relief Camps—when nearly half the Population of Villages have died of Famine Cholera—when men were not put on the Relief Works till they were too far reduced by starvation to do any real work—when their bullocks were all dead, so that their very means for raising the next crop were all gone—we are fain to ask what has Irrigation done for the Madras Presidency? This question, a Report just issued by the Madras Irrigation Company, dated May 8, 1877, received at the India Office June 19th, answers for us at least as respects one District. But first let us observe that there are four Districts at this time which ought to have been like the other twelve, overwhelmed by this terrible calamity, but three of which are not only free from Famine themselves, but are in the highest state of prosperity, having a large surplus to supply the other Districts; and the fourth, though not entirely relieved from Famine, yet has a very considerable supply of Grain. What has made the difference between these three Districts and those which are under the terrible sufferings of Famine? The Government Irrigation Works. The three Districts, Tanjore, Godavery, and Kistnah, instead of adding five Millions more to starve, are pouring into the starving Districts hundreds of thousands of tons of food. Sir Arthur Cotton, 26 years in charge of those very Districts, which are in the heart of Famine, supplying food, could tell us more of this. It was the same in the Behar Famine. The Behar Works, while they were yet unfit to be opened, were made to Water 160,000 acres, producing a crop worth £500,000 in the midst of dearth. The whole cost of the Works were actually paid by a single crop, and thousands of people saved from death.

But to return to the fourth of the above Districts referred to: this is Kurnool in the N.W. of Madras, in the very depths of the Famine part of the Peninsula. This is the District watered by the Irrigation Company, from the Toombudra River. The Works have cost £1,600,000, and are capable of watering two crops on 400,000 acres, or at the rate of £2 per acre of crop. Then, also, the Water would afford Carriage at a nominal cost. The main Canal, alone, is 190 miles in length from Kurnool to Cuddapah. The Officers are to sell the Water at the price of twelve shillings per acre, worth £2.

A Missionary in the Godavery District told Sir Arthur, that scores of times the people had gratefully said to him “we never got the Godavery Water on our lands till you Christians came here,”

Truly the greatest Raj is the English. In Kurnool, however, last year as before, the Water was refused by the people in the main cultivating season; but when the pressure began to be felt, they forgot all their difficulties and began to ask urgently for the Water. By this time the supply was already beginning to be deficient, so that the Canal could not be kept full. Nevertheless, let us see what was done by these Works I quote from the Report above mentioned; "the total area that has been supplied from these Works is 91,000 acres. In addition to the satisfactory Revenue thus realized by the Company, the food raised by the Canal has contributed materially to mitigate, in the Districts of Kurnool and Cuddapah, the effects of the terrible drought, to which these and other Districts of S. India have been, and still are exposed. The money value given in the following statement of the grain grown under the Canal is £940,600, none of which could have existed but for the Irrigation supplied." The Works having cost £1,600,000, two thirds have thus been saved by a single partial crop. The Report then goes on to complain of their being prevented from using the Canal for Navigation owing to the delays in the proceedings of Government, showing how the value of the Canal, if it had been used for Boats, would have been considerable. The cartage from the Gooty Railway Station of Rice to Kurnool is 5d. per ton per mile, or £1 6s. per ton. But that from Cuddapah to Nundial is 7d. per ton per mile, or £2 3s. for the whole distance. The rate by Canal, even at the rate of $1\frac{1}{2}$ d. a mile, would be 10s. The want of any better outlet for Canal produce has been a bar to the spread of Irrigation under the Canal. Yet this Canal produce might have been put in direct communication with Madras and with all the Markets of the World at a nominal cost of internal carriage. The Canal now extending to Cuddapah ends there. This is 190 miles. The North Canal from Madras extends to Nelloor 110 miles, and the interval between these is 80 miles. This work has been estimated, but still remains unexecuted. Had it been executed there would have been a perfect communication between the great irrigated Districts of Godavery, &c., and the Inland Districts which are in this terrible condition.

The extension of the N. Coast Canal to the Kistnah is an immense point gained. The Duke of Buckingham is also cutting the short line of Canal through Madras, to connect the S. Coast Canal with the N. Canal. Let us resume our extracts from this important report. Oct., 1876. "Throughout the month not a drop of water has been allowed to run to waste down the Pennair;" that is, the whole of it has been "used for irrigation. "In another fortnight, or so, all the accessible dry land for which water is desired, will have had a first flooding." again; "applications for water have been very numerous, and from all sorts of places, far beyond the reach of the water. We are also much hindered by the quarrelling among the ryots themselves as to who shall first have the water". In November it is reported, the most

“bigoted of the old ryots are now quarrelling and fighting for the water. The old prejudice is entirely broken down. And as a Kurnum expressed it, they, the ryots, have come to their senses about the water, The sight of the country commanded by the Canal is truly refreshing. In one village above Canalla, I rode through tall cholum fields for a mile or two. There, more than three square miles of land were saved from utter drought, and about 300 acres of rice were just ripening. It is very sad to compare this with the rest of the district, where utter failure has occurred, and I am sorry to say cholera is rapidly increasing. How we wish the Illustrated News could give us two of its admirable views,—first of the desert and then of the irrigated land, often seen side by side, misery and plenty, starvation and comfort. Again; all the crops are reported in good condition, both dry and wet. The former sown under the Canal, are acknowledged by the ryots themselves, to be in as fine and healthy condition as any crops that ever were sown. Of the thirteen Government tanks, commanded by the Canal, five were filled before the end of the month, and the remainder will be filled before the middle of next.

For December the Chief Engineer reports in January, 1877;
 “The result of my calculation is

In Cuddapah.....	19,000,000 lbs of food grain.
In Kurnool	65,240,000

Total..... 84,240,000-lbs.

“enough to feed the whole district of Kurnool for two months, and probably the straw will be enough to maintain all the cattle that are not yet perished in the villages under the Canal; in this calculation vegetables are not reckoned as being any substitute for food grain, whereas they do often save grain; E.G. sweet potatoes, brinjals, pumpkins, &c. This grain at present prices is worth £700,000; and if the value of vegetables, cotton and straw be added, the actual value of the crop created by the Canal, cannot be more nearly estimated than at a million sterling. But its value in helping the district to tide over the critical month of May, and in supplying village wells with good water, can only be poorly represented by such an estimate. The actual saving to government by the provision in the least accessible parts of the district, of such a food supply, which would otherwise have had to be bought, is about £500,000. The government are now feeding at imperial expense, a third of the population of the Kurnool district. This could scarcely have happened, had the ryots not sacrificed the whole of the first crop, which the Canal might have matured by irrigating their fields and filling their tanks. This infatuation fortunately did not extend to the second crop, about a quarter of which will have been reared under the already falling water supply of the Toombudra.”

Again; “it is probable that the ryots under the Canal, will save most of their cattle, and thus be able to resume their work on the first appearance of rain. Elsewhere in the district it is probable that

" much land will be idle, as nearly all the cattle will be dead. The sale
 " of bullocks has been so great that the coolies find it cheaper to buy
 " meat than grain, a bullock selling for 3 ru." Again; "The villages
 " under the Canal may be considered to be in a very prosperous con-
 " dition, the crops being very good indeed. In January of this year,
 " the Overseer reports that the white Cholum sown in Prattacotta is
 " magnificent. I have never seen finer crops of this grain than those
 " of Banakercherla and Venputa. The ears were so full and the plants
 " so thickly grown that they were touching each other." Again;
 " the average yield per acre is, 2 putties, which is above that of the
 " preceding season; this putty has been recently sold at 48 ru.; the
 " straw is almost half as valuable as the grain." Thus the whole
 value of the crop is about 140 ru., while the charge for water is 6 ru.,
 and the total cost of the works is only £3 per acre of rice. In February
 it is reported, "the wet crops, more particularly in the Cuddapah and
 " Prodatoor Talooks, are the finest that have ever been reaped." In
 March it is estimated, "that nearly 70 million pounds of food grain have
 " been grown under the Canal in three talooks. This is sufficient to
 " preserve one quarter of the population of the Kurnool district for six
 " months, and to feed more than 8,000 pair of Bullocks. There can be no
 " doubt that if the water were properly and timely taken, and with the
 " same eagerness that it was taken this season, when it was too late, the
 " grain grown under the Canal in the Kurnool district would feed the
 " whole population, amounting to a million, for 12 months, even if no
 " crops were raised except from Canal Irrigation. Again, in March;
 " there is little doubt that the Canal water affects the health of the
 " population considerably. When procurable Canal water is always
 " preferred to Well water; some villagers are in the habit of going 2
 " miles for it. While in Camp I was unable to find a well in any village
 " containing water fit to drink. In one place though greatly in want of
 " a draught of water, I was compelled to abstain from drinking the water
 " of three wells, as the taste was filthy." Thus far the quotations.
 Have these things no bearing upon the Famine? As regards Canal
 Transit, Grain can be carried by Water at one twentieth of the cost
 by Railway, which besides cannot produce one pound of food for either
 man or beast. Had two millions that this will cost been spent on
 Irrigation and Navigation, the whole of these provinces would have
 been secured for ever from Famine, and from ten to twenty millions
 added to the income of the people. Further, had the necessary pre-
 parations been made when the Famine had become certain, the Link of
 the Canal might have been cut from Cuddapah to Nelloor, and the
 districts of Bellary, Kurnool and Cuddapah, have been put in direct
 communication with Madras and with Godavery and Kistnah. Thus
 the Famine would have been turned into a blessing, and an annual
 benefit derived to the country far beyond the interest of ten millions.
 The extension of the Coast Canal has at last been undertaken from
 Nelloor to the Kistnah. By the latest accounts 50,000 people were em-

ployed upon it, and it was expected to be finished next month. If this is accomplished, putting Madras in communication with those great Deltas and with the *Coal Tracts* of the Godavery, it is quite certain that far more will be gained from this small work than the interest of ten millions. It will complete one line of transit of 550 miles from Madras to the second Barrier on the Godavery, and will connect altogether 1200 miles of Navigation with that City. Sir Arthur Cotton has repeatedly pressed upon the authorities, both in India and and at home, the necessity of providing for these Famines, whenever the failure of the Monsoon renders such a calamity certain, by marking out an important work of Irrigation or Navigation, erecting shelter, and collecting tools and food before hand, so that as soon as the pressure of the Famine is felt, well organized parties may be set to work at once and before they are reduced to a state unfit for work. Now their ribs must show the signal for them to be employed on the Relief Works. There is always time for that but it as never been done. The consequence is almost the whole of the money expended on the works is lost. Whereas a Famine is in fact the opportunity of executing in a single season, important works to raise India out of its present poverty for ever. Hitherto without exception, not a finger has been moved till the people were actually dying, and then it was too late to organize works effectually. What might not the millions that the last 2 Famines have cost have done to make Famines impossible. In Mr. Monier Williams letter to the Times from Manura, December 2nd, he says; "all the Belts of Land reached by the grand system of Irrigation " which stretches between the Godavery, Kistnah and Cauvery Rivers,— " fertilizing the soil wherever it reaches, and forcing even the haters of " English rule to admit that no other Raj ever conferred on India such " benefits,—present a marvellous contrast to the immense tracks of arid " waste which meet the eye of the traveller as he journeys by the great " India Peninsular, Madras, and S. India Railway."

Here are subjects for the Illustrated News. Look here upon this picture and on this. Had half a million more acres been Irrigated in each of these districts, and had they been put in effective communication with the rest of India by Steam Boat Canals, which would have admitted of all India being laid under contribution for food, the Famine would have been nothing comparatively. And had the comparative few who would then have had to be fed, been employed on further great works, the Famine would have been a source of plenty. Gen. Strachey said on May the 18th, at the Royal Institution; "we must be content to " pass through a condition of periodical suffering of an acute kind, " during which ways of escape from these evils will be gradually perfected, " these ways of escape are indeed already sufficiently evident, and so far " as they have been hitherto applied, they have been found to be " thoroughly efficacious, they are the provision of artificial Irrigation " and improved transit."

And he "has passed a large part of his life in seeking for the

“ means of extending those essential material allies in the battle of Indian life.” As regards Bengal, an Act is being prepared for a compulsory Water Rate in Bengal, which though stopped at present will be carried through if possible. It is estimated that the Land-owners benefit to the extent of 2-ru. an acre from the Irrigation Works, even when they do not use the Water, through the embanking of the Rivers, the drainage of the land, &c.; if they pay those two rupees, they will have the Water for nothing.

In the Godavery and Tanjore where the Tamul and Teloogoo people had sense enough to know their own interests, it was sufficient to give them Water and they took and used it. But where the people are as stupid as some people in England, who would not have Factory laws, there is nothing for it but to make them have them. We see what the Famine has done in making the people take the Water under the Toombudra, compelling the people to benefit themselves. Why should we wait for a Famine to do this? It is estimated that the lands in Orissa have actually increased in value three or four fold since the Irrigation Works, without the Water being used: the Zemindars thus receiving the whole of the benefit of the Works while the Government have had the whole of the expense. This year as has been said, a Crop in Kurnool is worth 140-ru., or 24 years of their Water Rate.

If all England could set their face against the Suez Canal, we must not be surprised if there are other people almost as stolid. Another Nation had to cut the Canal for us and thus force upon us an incalculable benefit. In England and Bengal you must take people as you find them and force blessings upon them. So we thank God and take courage. We are really gaining ground.

FLORENCE NIGHTINGALE

APPENDIX C.

Works Required to be Executed at Present.

I propose only to sketch out here the works that I consider of paramount importance. These are effective communications, that is, works that can carry *any quantity* at a *nominal cost*. The railways cannot do these two things. They are doing certainly great service, but they fail in these two essential points. But of course the lines that should first be made of water communication, are those on which there are not even railways. I am glad to hear that one of the most important lines that could be formed is actually in hand, if it is not as I hope from what I hear, in operation. This is the connection of the Northern Madras Canal, which extends already 110 miles to Nelloor, with the system of Navigation of the Godavery and Kistnah Rivers. When last I heard there were 50,000 people at work on this. This work would put Madras itself in direct communication with the grand grain districts watered by those rivers. The line of a few miles through Madras to connect the North and South Coast Canals, is in hand; this will carry the Northern grain to the Pallaur, 40 miles S. of Madras. The next most important line I consider to be the connection of the Northern Canal with the Toombudra Canals by a line from Nelloor to Cuddapah, 80 miles. This would give complete effect to the main Canal there of 190 miles, to above Kurnool, making a line of 380 miles from Madras, in a N.W. direction into the very heart of the Peninsula. The whole surplus of Godavery and Kistnah, would thus be placed entirely at the disposal of Government for one of the worst tracts. This work has been thoroughly projected and estimated, and there is nothing to prevent its being instantly commenced. With the multitudes now at the disposal of Government, it might be completed in a few months.

But the most important work, ultimately, I consider, is the Canal through the S.W. of the Presidency, from Madras to Ponany on the W. Coast, about 400 miles. This would lay open a vast tract of fertile country, and in connection with the N. and N.W. lines, place a large portion of the Presidency in communication with a point the best situated for communication with Europe by the Red Sea. This Canal would of course Irrigate the whole way, placing the floods of the Cauvery and other Rivers of which an immense portion at present runs to waste in the sea, at the disposal of Government. The value of this work could not be over estimated. It would entirely revolutionize four districts. It would give a new value to everything they produce, and turn into gold, or rather food, the millions of tons of water which are now so criminally allowed to run to waste from the Southern Rivers. This is one of the grand main lines that India requires.

I will only give one more case of a work that ought to be now undertaken. There is on the river Toombudra, some hundred miles

above the present works, a wonderful site for a tank which, if constructed would produce enormous results. At a place called Valavapoor, nearly West of Bellary, there is a position where the river has a rapid slope downwards; but above, there is an extremely gentle rise of less than a foot a mile, so that a low bund of 50-ft. would retain the water back for 40 miles, giving a water surface of perhaps 150 square miles; such a bund would give a capacity of about 1500 million cubic yards, and as the river Toombudra has an immense supply of water, this tank, besides supplying a continual stream of 2 million cubic yards an hour during the 5 months that the river is in flood, would leave the tank quite full at the end of the Monsoon, providing 300,000 cubic yards an hour for the whole of the dry season. The canal from this would extend in an easterly direction to the present Companies Canals, thus completing the communication from Madras of 500 miles, and from the Upper Godavery of 1000 miles. An immense plain of from one to two million acres in Bellary would thus be watered, and 100,000 cubic yards an hour might be sent down the Kistnah to keep the Canals of that Delta full, or at least navigable during the dry season. The total value of this work could not be over estimated. It has been very well investigated, and we have very good data for estimating its cost at 20 ru. an acre, while the value of crop would be about 35 ru. above the present dry crops. This would be 175 per cent. besides the Navigation. Compare such an employment of capital with a Railway costing £20,000 a mile, and requiring a large subsidy from Government. I only give these as specimens of the works that might and ought to be undertaken without a moments loss of time. There is in fact an unbounded field for the employment of people and capital throughout the districts now suffering, and this great calamity can certainly be turned into as great a blessing. I should mention that a noble project for a vast scheme of Navigation through the S. Mahratta country, that is the S. districts of Bombay, has been long under consideration, which is exactly suited for execution at this time. It has been in contemplation to form a company for this for the last year or two.

Besides the total failure of the railways to carry cheaply, which is now ascertained beyond all doubt, they are at this moment found to be unequal to the conveyance even of the small quantities required for mere food. The papers are full of such notices as the following; "the whole length of the beach is covered with piles of rice, and the railway is unable to convey it into the interior as fast as it is wanted." The Railways could not carry a fifth part of what would be required if they could carry cheaply. Steam boat Canals would carry any quantity that could be required. The Railway reports states the enormous increase of receipts at present, but they don't add, but the money has been paid out of the Treasury, for the carriage of grain.

APPENDIX D.

It will be well perhaps to remark on some mistakes which are almost universal on this subject. The first is, that if a tract has plenty of rain, there is no necessity for Irrigation.

One plain answer to this is, that the Famine in Orissa occurred after a Monsoon of 60 inches. The question is not how much rain falls, but how it falls. In Orissa 30 inches fell in June and July. There was then a pause of six weeks during which the whole crop perished, and the 30 inches that fell in September could not restore it.

One or two floodings in August from Canals would have turned this Famine into a year of great abundance. No quantity of rain will prevent a Famine, if it is not tolerably distributed. The fact is, water from Irrigation is required in almost every part of India even to prevent Famine. But further, there is never a season when at some time or other, additional water would not improve the crop. Again, when we say "Irrigation," we always mean the complete regulation of the water, that is including draining; and so there is never a season when there is not at some moment excess of rain, which requires to be carried off by a system of drains.

It is this *regulation of the water* that is needed, and which so abundantly repays the cost of works. God gives us the rain, but as in everything else, he leaves something for us to do, which if we are too indolent to do, we must suffer for it.

The second is that water is water, but this is also a great mistake; there are three kinds of water in agriculture. That from rain, water that has been stored in tanks, and water led direct from the rivers to the fields. The first has been filtered, and does little more than afford moisture; the second has deposited most of its rich contents which have been held in suspension, though it conveys to the fields what was in solution; but the third comes to the land loaded with everything that the plant can want. With this, the land is perfectly renewed. Lands that have been watered for hundreds of years from rivers, continue to afford white crops without diminution, though without manure. The district of Tanjore which has lands in it that were watered from the Grand Anicut in the second century, and ever since, continues as fertile as ever. No application of well or rain water, can make up for the want of river water. Thus the Midnapoor ryots begin to understand this, so that after a fall of rain they empty their fields as quickly as they can, and fill them again from the Canals.

A third is, that Irrigation as a rule produces fever. One answer to this is, that I have lived all my life in the midst of Irrigation, and never encountered a single instance of fever produced by Irrigation either in my own case or that of others. A few years ago there was fever in Godavery, but the report of the Medical Officer was that the same fever was spread all over the neighbouring district, and was not produced by the Irrigation. I don't however deny that there have been localities and

times, when Irrigation has produced fever, but I believe this is generally out of the tropics. And it is quite certain that it is the exception, and against this we must set the enormous increase of health, arising from the people being well fed, clothed and housed. The most dreadful fever we have ever had in India, is that which has desolated the country round Calcutta, solely from want of water. This is entirely where the country is unirrigated and undrained. When the Engineer, and the Medical Officer were ordered to enquire into this, they both reported that the first cause of this fatal fever was the shocking state of the people in respect of even food, that they were so dreadfully underfed that they had no stamina, but succumbed at once to a fever, that they might have otherwise thrown off with ease. Think of this under our rule. So the question in England about the deaths from Railways, is not how many are killed, but how many are saved from death by this mode of moving in comparison with the use of horses. Nothing can be more certain than that for one death caused by fever from Irrigation, a hundred are prevented by all the sanitary effects of regulated water. And what shall we say to the deaths caused by Famine? Do they not exceed all those that have ever been imagined to proceed from Irrigation? These are only specimens of the mistaken notions that men bring forward without taking the trouble to obtain the smallest information on the subject. Of the unaccountable absurdities that enter mens heads, who have not one idea on the subject, we have a notable instance in this days Times, August 28.

It is of course impossible to answer all such fancies. And with respect to the use of water for navigation, the absurd mistakes about this are greater than those about Irrigation.

Probably the first is, you can't have great speed by water. The first answer to this is that in every country, but especially in a poor country where all material improvement has, as it were, but just begun, speed is utterly insignificant in comparison of cheapness. Whether wheat is carried at 40 miles an hour, or at two, is a matter of no importance whatever, but whether it is carried at a cost of a penny a mile, or 20 miles for a penny, makes the whole difference, whether in ordinary years there is any possibility of its reaching the markets of England at all or not. And the second answer is, that there is nothing in the world to prevent any speed on water. There is a boat on the Lake of Geneva at this moment running at a higher speed than most of the mails are carried at on the Railways in India, 24 miles an hour. There is not the slightest object in 99-hundredths of the traffic in India going at more than 10 miles an hour, even the passenger traffic, nor in the goods going at more than two miles. But whether there are Canals at all or not, depends whether we can afford relief and prevent millions dying of Famine. But let us only consider the question of cost. Suppose the 160 millions that the Railways have cost for 7000 miles, had been spent at the rate of £3000 a mile on 50,000 miles of steam boat Canal, what would have been the state of India now; for instance

in respect of the Famine. Every corner of the Famine districts would have been now within easy reach of the most productive tract in India.

To convey food for 20 millions of people from a thousand miles by such Canals, a years supply, would have cost only £1,000,000. But who can estimate what the state of India would have been on the whole by this time, if instead of spending this 160 millions on railways during the last 25 years, this same had been spent on the Canals? One thing is certain, that all the world could not have shown another country in such a state of material prosperity. If people could only see the life put into Godavery by the Canals, though without steam, the multitudes of both goods and passenger boats, that swarm on them, they might form some idea of what would be the state of things, if the same district were put in communication with all India by the same means. So also for military purposes, there is no sort of comparison between the two. Troops might be conveyed by Canals any distance, with their usual sleep and food, and landed perfectly fresh at any spot at any moment, without any confusion from other traffic, and the Canals could be patrolled by armed steamers day and night. The Canals that have been made already have cost £1000 to £6000 a mile, and are from 25 to 60 yards wide. What country in the world could compete with India with her immense, and industrious population, if she had such a complete system of *effective* internal transit.

